

Health Consultation

12TH AVENUE SOLVENTS
AVA, DOUGLAS COUNTY, MISSOURI

EPA FACILITY ID: MON000704015

MARCH 9, 2005

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

12TH AVENUE SOLVENTS
AVA, DOUGLAS COUNTY, MISSOURI

EPA FACILITY ID: MON000704015

Prepared by:

Missouri Department of Health and Senior Services
Division of Environmental Health and Communicable
Disease Prevention
Section for Environmental Public Health
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

STATEMENT OF ISSUES AND BACKGROUND

STATEMENT OF ISSUES

The U.S. Environmental Protection Agency (EPA), through the Region VII Office of the Agency for Toxic Substances and Disease Registry (ATSDR), has requested that the Missouri Department of Health and Senior Services (DHSS) complete a health consultation for the 12th Avenue Solvents site in Ava, Douglas County, Missouri. This health consultation examines contaminant concentrations present on the site, the potential for human exposure, and any corresponding threat to public health.

BACKGROUND

The 12th Avenue Solvents site is located in Ava, Douglas County, Missouri. This site is in a mixed industrial, commercial, and residential area of the city. It includes the Copeland Manufacturing Facility (Copeland facility) at 1400 NW Third Street and the Rawlings Manufacturing Plant (Rawlings plant), located at 400 NW 12th Avenue (1). Figure 1 shows the site layout in relation to 12th Avenue.

Emerson Electric Company, Inc. (Emerson Electric) formerly operated the property at 1400 NW Third Street. However, this approximately 16-acre site is now operated by Copeland Corporation, a wholly owned subsidiary of Emerson Electric. Manufacturing and office spaces, warehouse/dock areas, and support locations are located at this facility. The Rawlings plant, at 400 NW 12th Avenue, is a manufacturer of baseball gloves and other sports equipment.

Before 1968, the facility property was residential. In 1968, a building was constructed for the Spalding Sporting Goods Company, who leased this property from the City of Ava to manufacture sporting goods. In 1971, the Spalding Sporting Goods Company expanded the building, and operated there until 1973. In 1973, the city of Ava leased the facility to Emerson Electric, which occupied the property from June through December 1973 (1). The plant closed in December 1973, and it remained closed until Emerson Electric reopened the facility in 1975, to manufacture and assemble electric motors, through 1996. Copeland Corporation took possession of the facility in January 1997 and currently leases the property from the city of Ava. The company manufactures scroll compressors (1). The site is not fenced, and access to the site is unrestricted.

From 1973–1996, during the manufacturing of electric motors, Emerson Electric used and generated several chemicals, including xylene, ethylbenzene, varnish (for coating), parts degreasers, 1,1,1-trichloroethane (TCA) (for cleaning varnish pumps), petroleum naphtha (in surface-coating operations), aromatic solvent, metal-plating chemicals, steel, aluminum, copper, brass, No.1 fuel oil, propane, oxygen, and others.

In August 1994, three above-ground storage tanks were removed from the southwest portion of the property that is now the Copeland facility. A 7,000-gallon xylene tank, a 7,000-gallon

varnish tank, a 1,000-gallon paint thinner (light aromatic solvent naptha) tank, and the underground tank piping and pump assembly were removed. During removal of the tank piping, soil contaminated with xylene and ethylbenzene was encountered. Approximately 150 tons of contaminated soil was removed. Seventeen soil samples were collected from excavated areas, at approximately three feet below ground surface, during the removal and analyzed for toluene, ethylbenzene, and total xylenes. The results ranged from non-detect to 2,130 micrograms per kilogram ($\mu\text{g/kg}$) for toluene, non-detect to 309,100 $\mu\text{g/kg}$ for ethylbenzene, and non-detect to 867,600 $\mu\text{g/kg}$ for xylenes (2). These results indicate that the affected soil extended beyond the excavated depth.

A new electrical transformer pad was constructed in 1996, in the vicinity of the former xylene and varnish product tank lines. Additional contaminated soil was detected in the construction area, and approximately 60 tons of soil was removed and disposed of off-site. A groundwater investigation in the southwest portion of the 12th Avenue site also was conducted in January 1996. Three groundwater-monitoring wells were installed above the bedrock interface and soil samples were taken. The sampling results indicated that a groundwater plume containing high levels of xylene and ethylbenzene was present on-site. The highest concentrations of total xylenes [94, 941 micrograms per liter ($\mu\text{g/L}$)] and ethylbenzene (23,139 $\mu\text{g/L}$) were detected at the monitoring well located just north of the former xylene and varnish tanks. One dual-phase groundwater and soil-vapor-extraction well, and a dual-vapor-extraction (DVE) system were installed in July 1996, to remove contaminants remaining in the soil and groundwater. This system experienced operational difficulty, vandalism, and pump and power supply problems, which prevented the system from running on a consistent basis. The system was repaired and upgraded to improve its operating efficiency; however, it was eventually removed.

The Rawlings plant reported that the facility used TCA in the manufacturing of plastic helmets until 1998 or 1999. During a site visit in 2001, two potential existing sources of subsurface contamination were identified. One is a 12,000-gallon underground storage tank (UST) containing No. 4 fuel oil. The tank is approximately 15 to 20 years old and did not appear to be leaking when periodic stick tests were taken (3). The other potential source is an underground cistern, which collects overflow from indoor spills. Reportedly, the cistern has never been used for collecting overflow from spills.

The 12th Avenue Solvent site is bordered on the north by a city (Ava) roads project, to the east by parking lots, residences, and the Community Laundromat, and to the south by the Douglas County Department of Health and residential properties (1). To the west of the 12th Avenue site is property owned by Sentinel Industries, Inc., which at one time was the location of Sentinel Wood Treating, Inc. Both the Community Laundromat and the Sentinel Wood Treating Inc. site are considered to be potential sources of groundwater contamination in the area. Figure 1 contains a map of all the sites in the area. Contamination at the Community Laundromat site and potential human exposure are currently being investigated and will be discussed in a separate health consultation by DHSS. The contamination at the Sentinel Wood Treating site and potential human exposure are discussed in a separate health consultation by DHSS titled, "*Sentinel Wood Treating Company, Incorporated,*" dated April 27, 2004.

An unnamed tributary to Prairie Creek begins as two unnamed streams come together at the northern edge of the Sentinel site, the resulting stream flows across the property, under 12th Avenue, through a sparsely populated residential area, then a city park, and ultimately into Prairie Creek (4). There is a small wetland area immediately south of 12th Avenue and east of the unnamed tributary that also flows into the unnamed tributary further downstream. Prairie Creek is a gaining and losing stream at various points along its course, depending on the time of year and the amount of precipitation. According to the residents of Ava, children mostly use the creek for recreational purposes. No fishing was reported to take place in the creek. Prairie Creek joins Cowskin Creek and ultimately flows into Beaver Creek approximately five miles from 12th Avenue. No sensitive (threatened or endangered) species or communities have been identified along the unnamed tributary or Prairie Creek (5). The contamination in the unnamed tributary and potential human exposure is currently being reviewed and will be discussed in a separate health consultation by DHSS.

South of 12th Avenue, across from the 12th Avenue Solvents site and the Community Laundromat, is a water treatment system operated by Emerson Electric. This system collects subsurface water from a buried french drain in the wetland area, treats it, and discharges it into the creek. The system also monitors and records the levels of contaminants in the water coming into the treatment system (influent) and in the treated water being discharged (effluent) into the unnamed tributary (Figure 2).

Reportedly, no private wells are in use within the city limits and all residents within a mile of the site are on municipal water (4). There are four municipal wells in the city of Ava's municipal water supply system (wells 2, 4, 5, and 6) and all wells are within four miles of the site. Municipal well #4 is on the 12th Avenue Solvents site, just south of the Copeland building (6). There are two wells (numbers 2 and 5) that are approximately one-half mile south of the site. Well #6 is approximately ¼ mile east of the site. See figure 2 for a map of the City of Ava's municipal water wells.

Site Investigations

Numerous investigations, including soil, sediment, groundwater and surface water sampling, have occurred at the 12th Avenue Solvents site, Community Laundromat site, Sentinel site, and the surrounding area. Results of these investigations have been used to determine the nature and extent of contamination at the sites and the migration of contaminants off-site, to evaluate the associated risk to public health, and to help select remedial alternatives. This consult will specifically discuss the 12th Avenue Solvents site.

Analytical results from on-site groundwater sampling were compared to ATSDR Environmental Media Evaluation Guides (EMEG). EMEGs for drinking water are guidelines used to determine if there is a need to further investigate exposure to chemicals for their possible health effects. Levels below an EMEG are unlikely to cause a health effect, and exposure to contaminants above their screening values does not mean that an adverse health effect will occur. Any contaminant that exceeds its respective EMEG value will need to be further evaluated to determine if there is the potential for any adverse health effects. Water sampling results were also compared to the EPA Maximum Contaminant Levels (MCLs). An MCL is the maximum

concentration of a chemical allowed by EPA in drinking water. The only comparison value available for lead is an action level established by EPA, an MCL is not available.

Soil data are compared with the residential and industrial Cleanup Levels for Missouri (CALM). CALM values are risk-based soil and groundwater cleanup levels at sites contaminated with hazardous substances. Cleanup levels are designed to be protective of human health and the environment. They were also compared to ATSDR comparison values (CVs). Contaminant concentrations that are less than the CV are unlikely to pose a health threat. Contaminant levels above the CV do not necessarily indicate that a health threat is present, but that further evaluation of the chemical and potential exposure pathways is needed.

In December 2000, EPA notified Emerson Electric and the Copeland Corporation that surface water samples collected southwest of the Copeland property contained detectable levels of xylene and ethylbenzene. This sampling indicated the contaminated groundwater plume had possibly shifted off-site. Consequently, Emerson Electric and the Copeland Corporation submitted a Phase 1 Soil and Groundwater Investigation Work Plan to EPA and the Missouri Department of Natural Resources (MDNR) on February 27, 2001. This Phase 1 investigation was conducted to determine whether contaminants detected in the wetland area were from activities associated with the Copeland facility or the former Emerson Motor Company facility.

The results from the Phase 1 groundwater investigation indicated that seven volatile organic compounds (VOCs): ethylbenzene, xylene, toluene, 1,1,1-TCA, 1,1-dichloroethene (1,1-DCE), trichloroethene (TCE), and cis 1,2-dichloroethene (cis-1, 2-DCE) were detected at levels above the EPA MCL. Environmental Strategies, LLC, conducted a Phase II investigation from June through August 2001, to define the horizontal and vertical extent of affected groundwater between the Copeland facility and the southwest corner of the Rawlings property.

Fourteen monitoring wells were installed during the Phase II investigation. Monitoring wells were drilled into three zones (zones A, B and C). Zone A's wells were drilled down to the bedrock, and ranged in depths of 8 feet to 21.5 feet while Zone B's monitoring wells were drilled down to the upper weathered bedrock and to a depth ranging from 13 feet to 29.25 feet. Zone C's monitoring well was drilled down 50 feet below surface. Samples were collected from these monitoring wells and submitted to an EPA-approved lab for testing. The laboratory results indicated that xylene, ethylbenzene, 1,1-DCE, 1,1,1-TCA, cis-1, 2-DCE, tetrachloroethene (PCE), benzene, and pentachlorophenol (PCP) were in concentrations above the MCLs. The concentration and distribution of the contaminants varies with each hydrogeologic unit due to geology of the site and the observed downward hydraulic gradient between the three zones(7). To evaluate the distribution of the affected groundwater along the eastern portion of the Rawlings property, four soil borings were installed. Groundwater samples were collected and analyzed. The sampling results indicated that three VOCs (total xylene, ethylbenzene, and PCE) were present in concentrations above their chemical-specific MCLs (7).

Environmental Strategies conducted a Site-Wide Assessment, in accordance with the approved Removal Assessment Work Plan, and the Supplemental Site-Wide Assessment and Removal Assessment Work Plan, from January 2002 through October 2002. The purpose of the Site-Wide Assessment was to depict areas of contaminated groundwater and to identify any contaminant

source areas remaining in unsaturated soils (7). Geotechnology, Inc., installed 17 monitoring wells in accordance with the Removal Assessment Agreement. A monitoring well was installed in the southwest corner of the Copeland property; along the city right-of-way on 13th Avenue between the Rawlings and Copeland properties; next to city well #4; in the southwest portion of the Rawlings property; in the northeast corner of the Douglas County Health Department property; and west of the Prairie Creek tributary. Analytical results of the groundwater samples collected during the site-wide assessment indicated that xylene, ethylbenzene, 1, 1-DCE, 1, 1, 1-TCA, cis-1, 2-DCE, PCE, benzene and pentachlorophenol were detected in groundwater at levels above the MCLs (7). The analytical results of on-site groundwater testing also indicate that lead was detected above the EPA's action level for drinking water of 15 µg/L.

Table 1 contains a listing of groundwater sampling results from the Phase II and Removal Assessment Groundwater Sampling Results separated by zones. The highest concentration from all the wells from three sampling events is listed. The sampling events took place on in the summer of 2001 and the spring of 2002 (7).

During this same investigation, 15 soil borings were collected from the southern portion of the Copeland Corporation property at depths of 5 to 10 feet below ground surface. No VOCs or semi-volatile organic compounds (SVOCs) were detected at levels exceeding the residential or industrial CALM values (7). The residential CALM value for arsenic, which is 11 milligrams per kilogram (mg/kg), was slightly exceeded in two samples (12 mg/kg and 11.9 mg/kg); however, the concentrations were below the industrial CALM Value of 14 mg/kg. No other metals were detected at concentrations above the residential CALM values.

In January 2003, the city of Ava began a project on the 12th Avenue Solvents site to install a utility pole on the northeastern corner of the Rawlings property and a trench connecting the pole to the corner of the Rawlings building (8). Organic vapors were monitored in the ambient air and two soil samples were taken. At times when the concentrations of vapors exceeded safe levels, workers discontinued excavation until the vapors had dissipated. Two soil samples were taken near the top of the trench wall. The sample results indicated that the soil was contaminated with ethylbenzene, benzene, toluene, and xylenes (8). No compounds were found in excess of their CALM soil cleanup levels, although concentrations of xylene did exceed the CALM value for leaching to groundwater. Xylene was found at one location at a concentration of 24,950 µg/kg, the CALM for leaching to groundwater is 16,000 µg/kg (8).

As part of the Administrative Order on Consent (AOC) between EPA, MDNR, and Emerson Electric, surface water in the area across from the 12th Avenue Solvents site is monitored by Emerson Electric and treated by a water treatment system. Sampling results, included as part of the December 2003 monthly report from Emerson Electric, indicated that contaminant levels in the influent are still elevated (9). However, because of Emerson Electric's water treatment, levels of most contaminants in the effluent that flows into an unnamed tributary are below detectable levels. During December 2003, vinyl chloride levels were elevated in the influent and effluent. The carbon vessel that treats for vinyl chloride needed to be replaced. This problem was resolved in January 2004 with replacement of the carbon vessel. Emerson Electric's surface water sampling in the portion of the unnamed tributary that flows south from the Sentinel site (Figure

3), also detected elevated PCP levels. Table 2 contains a listing of the sampling results from sampling done during December 2003.

DISCUSSION

Although tons of contaminated soil have been removed from this site, soil, and groundwater, and surface-water sampling results indicate that contaminants still exist in the soil and are migrating into groundwater and surface water. Contaminants have been found in the subsurface soil and groundwater at levels above acceptable levels; however, exposure to these contaminants is not likely to occur. All contaminated soil was at least 3 feet below ground surface. Because all the contaminated soil is below ground surface, exposure is not likely to occur, and the contamination is not considered to be a health concern. Potential risk to employees who work on-site is low because they do not come in contact with the contaminated subsurface soil. Exposures could occur if digging, drilling, or tilling were done on-site. The primary concern is the migration of contaminants into the groundwater and surface water.

There is no known contact with the groundwater on-site. Contaminated groundwater is migrating off-site and could pose an issue in the future if wells were drilled into the contaminated area. The highest concentrations of contaminants were found between 8 to 29.25 feet below ground surface. Although the closest municipal well (Ava Municipal Well #4) is located on-site, this well is drilled to more than 800 feet below the ground surface. In addition, monitoring results from the well do not indicate any contamination. At this time, the city (Ava) public drinking water supply does not appear to be affected. The closest down gradient wells are approximately one half mile south of the site. The companies currently operating on this site are either connected to city water or have private well water available. If any new public drinking-water wells are drilled on this site, as support for the city system or for industries that relocate there, sampling would need to be conducted to ensure that the water was acceptable for consumption.

Because of the treatment process carried out by Emerson Electric, contaminants from the 12th Avenue Solvents site are not contributing further to the contamination in the unnamed tributary to Prairie Creek. Levels are monitored monthly and reports are submitted to MDNR as part of the AOC between MDNR and Emerson Electric.

CONCLUSIONS

At this time no exposure to the subsurface soil or groundwater is anticipated and the contaminants are not affecting the city public water supply. Therefore, present exposure at the 12th Avenue Solvents site is classified as a *No Apparent Public Health Hazard*. The *No Apparent Public Health Hazard* category is one of five categories used by ATSDR and cooperating states for sites at which human exposure to contaminants is occurring, or has occurred in the past, but the exposure is below a level of health hazard. If site conditions change or well sampling indicates that surrounding wells or the city public water supply is adversely affected or treatment of the water in the wetland area would cease, DHSS will re-evaluate the hazard classification.

1. The treatment process carried out by Emerson Electric in the wetland area is preventing the contaminants from the 12th Avenue Solvents site from entering the unnamed tributary to Prairie Creek.
2. On-site groundwater and sub-surface soil is contaminated. Existing evidence indicates that exposure is not occurring presently, but it could potentially occur in the future, depending on land use of on the site.

RECOMMENDATIONS

1. EPA/MDNR/responsible parties should continue actions to mitigate or prevent future exposures, because the 12th Avenue Solvents site has been determined to be a continuing source of contamination in the soil and groundwater.
2. On-site soil disturbances should be restricted until remedial actions are completed. Any person involved in further sampling or remediation at this site should wear the appropriate personal protective equipment to prevent exposure to the contaminants.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the 12th Avenue Solvent site contains a description of actions to be taken by the Missouri Department of Health and Senior Services (DHSS), the Agency for Toxic Substances and Disease Registry (ATSDR), and other stakeholders. The purpose of the PHAP is to ensure that this health consultation is to identify public health hazards and to provide an action plan to mitigate and prevent adverse human health effects resulting from past, present, or future exposure to hazardous substances on or near the site. Included is a commitment from DHSS and ATSDR to follow up on this plan to ensure that it is implemented. The public health actions to be implemented are as follows:

1. DHSS/ATSDR will coordinate with environmental agencies to address community health concerns through written materials, one-on-one conversations with EPA or MDNR sponsored events or public meetings.
2. DHSS/ATSDR will evaluate any additional data that become available about human exposure or contaminants at the site, and make it available at EPA- or MDNR-sponsored events.
3. EPA/MDNR/Responsible Parties should continue to monitor public and private water wells in order to track the presence of contaminants and ensure levels do not exceed chemical-specific MCLs.

4. MDNR, through its cooperation program, will review the remedial action plan for the site and ensure, through monitoring and verification, that the remedial activities are proactive to residents and workers.

Prepared by:

Harry Ballard, Cherri Baysinger, Kristi Campbell, Missouri Department of Health and Senior Services

Attachments:

Figure 1- Map of All Areas on the Site

Figure 2- Emerson Electric Company Sampling and Monitoring Locations

Table 1– Listing of Maximum Detected Values from Phase II Assessment and Removal Assessment

Table 2– Emerson Electric Company, Inc., Water Monitoring Results

REFERENCES

1. Environmental Strategies Corporation, Inc. Summary Report of Phase 1 and 2 Investigations, 12th Avenue Solvent Site, Ava, Missouri; 2001, November 6.
2. U.S. Environmental Protection Agency. Enforcement Action Memorandum Request for Removal Action at the 12th Avenue Solvent Release Site, Ava, Douglas County, Missouri.
3. Tetra Tech EM, Inc. Revised Trip Report for Site Screening Assessment with Limited Sampling, 12th Avenue Solvent Release, Ava, Missouri. 2001 April 27.
4. Missouri Department of Health and Senior Services. Health Consultation. 420 NW 12th Avenue. Sentinel Wood Treating Company Incorporated. 1998 May 19.
5. Missouri Department of Natural Resources. Expanded Site Inspection Report, Sentinel Wood Treating Co. Inc. Site. Douglas County, Missouri. 2002 September 9.
6. Tetra Tech ME, Inc. Preliminary Assessment, 12th Avenue Solvent Site, Ava, Missouri. 2002 February 27.
7. Environmental Strategies Corporation, Inc., Removal Assessment Report for The 12th Avenue Solvents Site, Ava, Missouri. Cazenovia, New York: Environmental Strategies Corporation, Inc..2002, December 19.
8. Tetra Tech EM, Inc. Trip Report for Oversight of Utility Trench Excavation, 12th Avenue Solvent Site, Ava, Missouri. Lenexa, Kansas: Tetra Tech EM, Inc. 2003 (February 17).
9. Environmental Strategies Consulting, LLC. 12th Avenue Solvents Site, Monthly Project Status Report, Report No. 25. Lenexa, Kansas: Tetra Tech EM, Inc. 2003 (December).
10. Tetra Tech EM Inc., Preliminary assessment for Community Laundromat Site- Ava, Missouri. Lenexa, KS: 2002 February 15.

Certification

This 12th Avenue Solvents site Health Consultation was prepared by the Missouri Department of Health and Senior Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures' existing at the time the health consultation was initiated.

Technical Project Officer, CAT, SPAB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

Team Lead, CAT, SPAB, DHAC, ATSDR

Figure 1. Map of the 12th Avenue Solvent Site, Ava, Douglas County, Missouri

Source: Environmental Strategies Consulting, LLC. 2002.

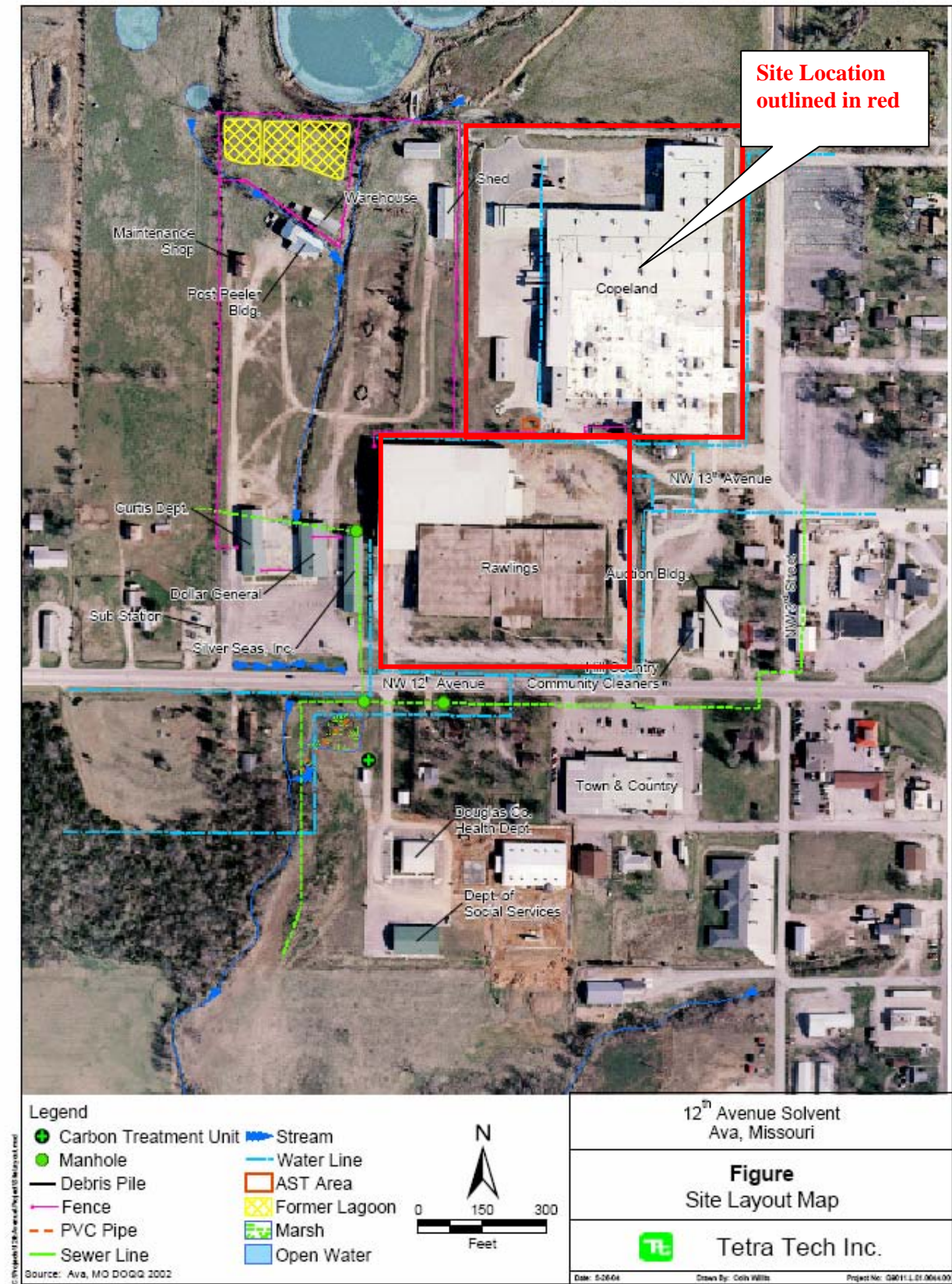
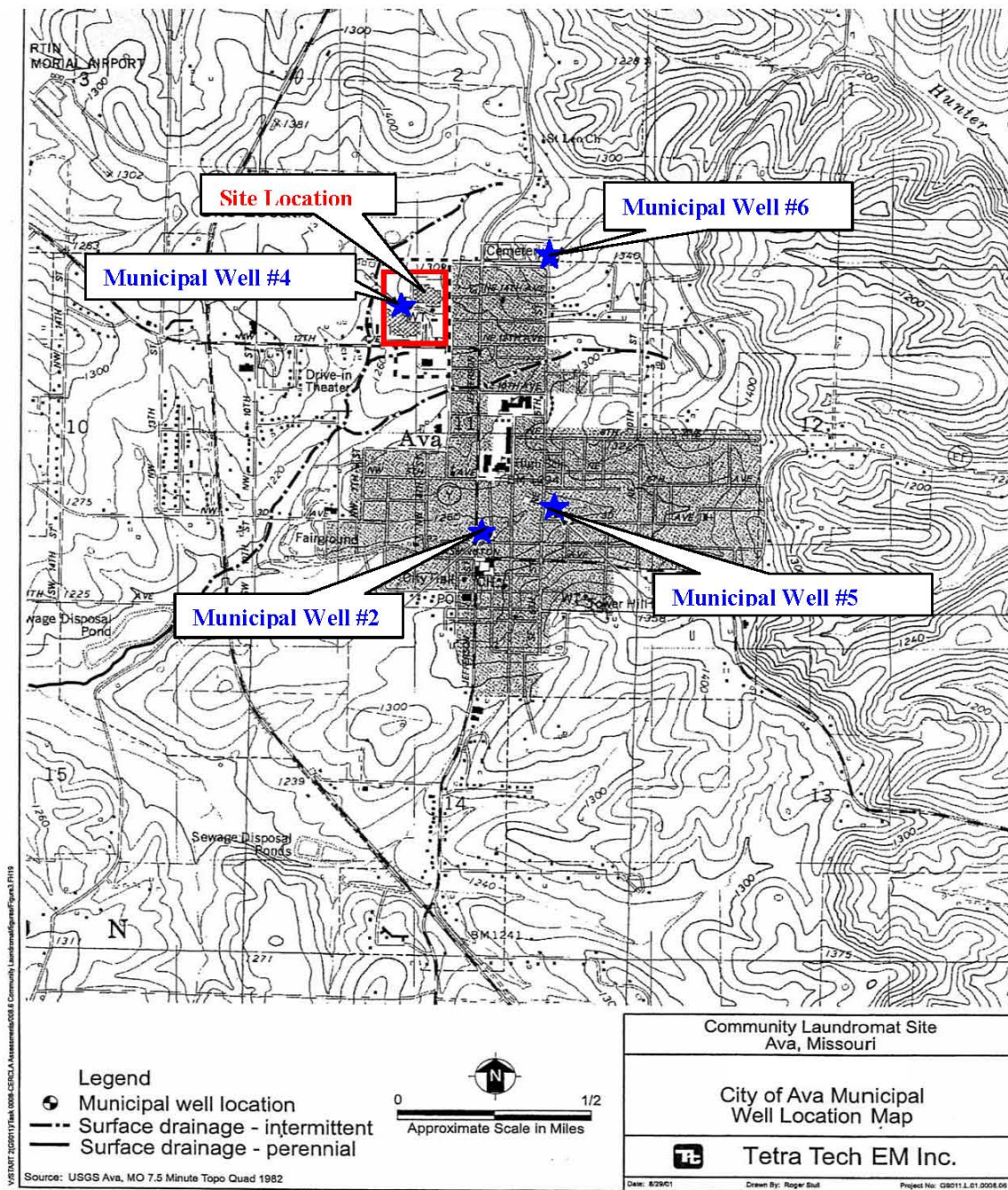
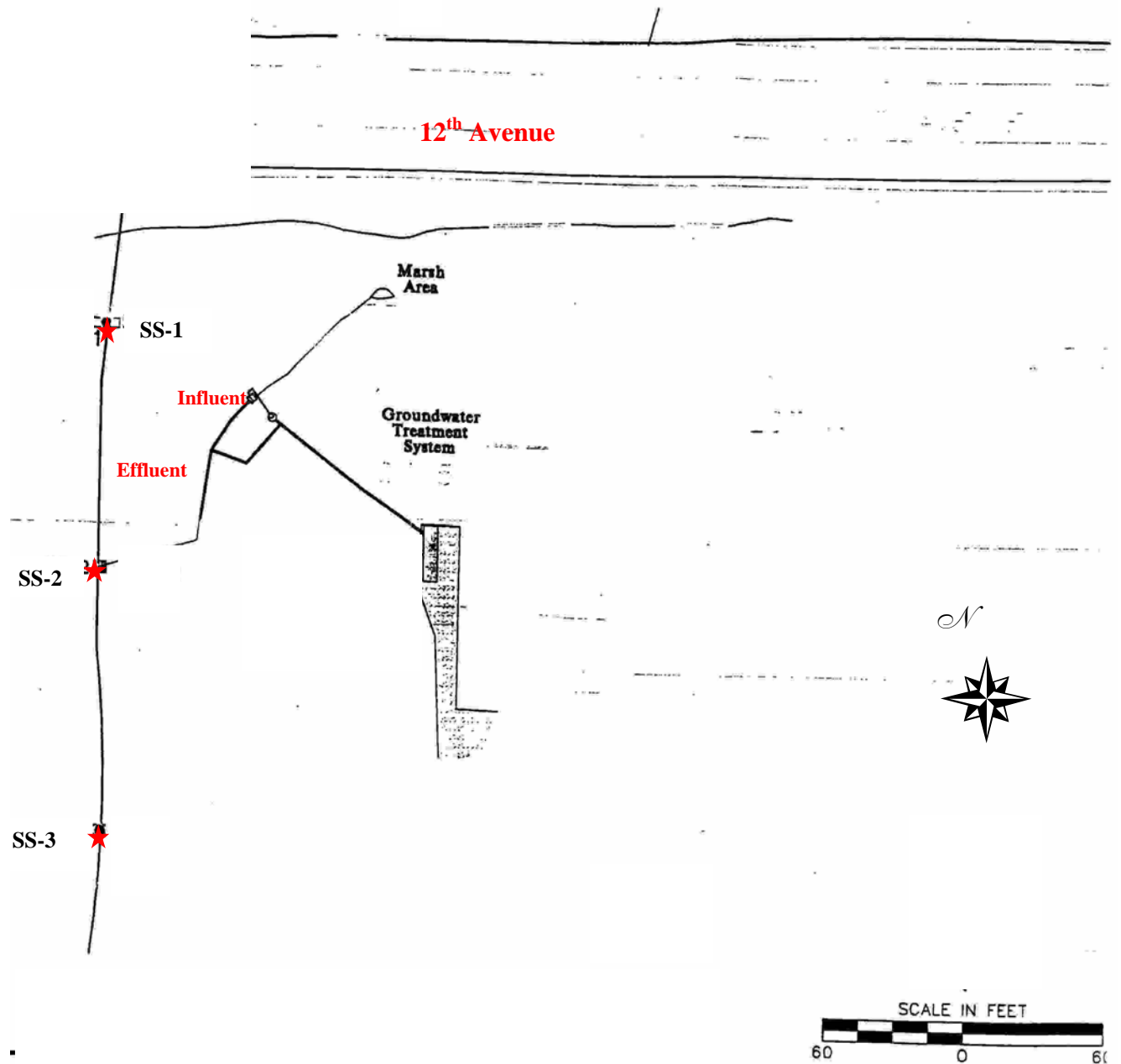


Figure 2. Map of Municipal Water Wells, Ava, Douglas County, Missouri.



Modified from: Tetra Tech EM Inc., Preliminary Assessment. Community Laundromat Site- Ava, Missouri.

Figure 3. Emerson Electric Company, Inc., Sampling and Monitoring Locations, 12th Avenue Solvent Site, Ava, Douglas County, Missouri



Modified from: Environmental Strategies Consulting, LLC. 12th Avenue Solvents Site, Monthly Project, 2003.

Table 1. Listing of Maximum Detected Values From Phase II Assessment and Removal Assessment, 12th Avenue Solvent Site, Ava, Douglas County, Missouri

Contaminant	Sampling Location	Contaminant Level (ppb* or µg/L [†])	Comparison Value [‡]
Pentachlorophenol	Zone A	19U[§]	10 ppb Child 40 ppb Adult 1 ppb MCL ^{**}
	Zone B	510D[¶]	
	Zone C	20U	
Benzene	Zone A	13	5 ppb MCL
	Zone B	58J^{††}	
	Zone C	0.5U	
Toluene	Zone A	230	200 ppb (Intermediate ^{‡‡} EMEG ^{§§} Child) 700 ppb (Intermediate EMEG Adult) 1000 ppb MCL
	Zone B	640	
	Zone C	0.5U	
Ethylbenzene	Zone A	19,000	1000 ppb (RMEG ^{¶¶} Child) 4000 ppb (RMEG Adult) 700 ppb MCL
	Zone B	30,000	
	Zone C	0.5U	
Xylene (total)	Zone A	100,000	2000 ppb (Intermediate EMEG Child) 7000 ppb (Intermediate EMEG Adult) 10,000 ppb MCL
	Zone B	120,000D	
	Zone C	0.4J	
Trichloroethene (TCE)	Zone A	840U	5 ppb MCL
	Zone B	59J	
	Zone C	0.5U	
Tetrachloroethene (PCE)	Zone A	840U	100 ppb (RMEG Child) 400 ppb (RMEG Adult) 5 ppb MCL
	Zone B	170	
	Zone C	0.6U	
Arsenic	Zone A	32.6	3 ppb (Chronic ^{***} EMEG Child) 10 ppb (Chronic EMEG Adult) 10 ppb MCL
	Zone B	69.2	
	Zone C	7.1J	
Lead	Zone A	38.4	15 ppb (EPA Action Level ^{†††})
	Zone B	1.8J	
	Zone C	1.8U	

Notes: Values in boldface type exceed comparison values.

Zone 1 wells are 8-21.5 feet below ground surface.

Zone 2 wells are 13-29.5 feet below ground surface.

Zone 3 wells are 50 feet below ground surface.

*ppm = parts per billion

[†]µg/L = micrograms per liter

[‡]Comparison value =

[§]U = Less than detection limit

^{**}MCL = Maximum Contaminant Level

^{††}J = Estimated value

^{‡‡} = Intermediate

^{†††}EPA Action Level = Contaminant concentrations for chemicals in drinking water, established by the U.S. Environmental Protection Agency

Source: Phase II Assessment and Removal Assessment, 12th Avenue Solvent Site, Ava, Douglas County, Missouri. 2001.

[¶]D = Diluted results

^{§§}EMEG = ATSDR Environmental Media Evaluation Guide

^{¶¶}RMEG = ATSDR Reference Dose Media Evaluation Guide

^{***}Chronic=exposure that occurs for more than 1 year

Table 2– Emerson Electric Company, Inc., Water Monitoring Results, 12th Avenue Solvent Site, Ava, Douglas County, Missouri

Contaminant	Influent	Effluent	SS-1	SS-2	SS-3	ATSDR* MRL [†]	EPA [‡] MCL [§]
1,1-Dichloroethane	310 U¶	0.5 U	1.8 U	0.8 U	0.5 U	Chronic, Oral 9	NA
Cis 1,2-Dichloroethene	130 JB	0.5 U	0.55 J	2.1	0.35 J	Acute, Oral 1,000	70
Ethylbenzene	4,300	0.052 J	5.9	0.84 U	0.034 J	Intermediate, Inhalation 1,000	700
Toluene	42 J**	0.09 J	0.72 J	0.2 JB	0.5 U	Acute, Oral 800	1,000
Vinyl Chloride	310 U	2.6	0.73 J	0.34 J	0.5 U	Chronic, Oral 0.02	2
Xylenes, total	17,000	0.12 J	130	58 B	0.22 J	Intermediate, Oral, 200	10,000
Pentachlorophenol	20 U	20 U	93	70	20 U	Acute, Oral 5	1

Notes: All values are in parts per billion or µg/L.

Values in bold typeface exceed an ATSDR MRL for acute, intermediate, or chronic exposure.

SS1, SS2; SS3 are sampling locations along the unnamed tributary to Prairie Creek, see Figure 2.

NA = Not available.

*ATSDR = Agency for Toxic Substances and Disease Registry.

[†]MRLs = ATSDR-establishes MRL values are categorized by exposure method and duration of exposure. (Inhalation, Oral=Orally; Acute=contact that occurs only once or up to 14 days; Intermediate=contact that occurs for more than 14 days but less than 1 year; Chronic=contact that occurs for more than 1 year.)

[‡]EPA = U.S. Environmental Protection Agency

[§]MCL =

[¶]U = Not detected at reporting limit.

**J = Estimated value.

^{††}B = Analyte also detected in trip blank (with exception of metals, data result is less than reporting limit).

Source: Emerson Electric Company, Inc., Water Monitoring Results, 12th Avenue Solvent Site, Ava, Douglas County, Missouri. 2003